GOVERNMENT OF PUERTO RICO
DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES

September 17, 2019 Ref. Nos. #024-19/063-19

Via email to: christopher.dirscherl@hp.com

Christopher Dirscherl
Global Remediation and Environmental Programs Manager
HP, Inc.
501 Page Mill Road
Palo Alto, CA 94304

RE: Review of 2018 Second Semi-Annual Project Progress Report
(Q3-Q4 July through December2018)
HP Inc. (formerly Hewlett-Packard Company) Voluntary Remediation Project
San Germán, Puerto Rico
EPA Id. No. PRD991291857

Dear Ms. Curtis:

The Land Pollution Control Area's Hazardous Wastes Permits Division (HWPD) of the former Puerto Rico Environmental Quality Board (EQB), now merged to the Department of Natural and Environmental Resources (DNER), has finished the review of the 2018 Second Semi-Annual Project Progress Report (Q3-Q24 2018), dated February 12, 2019, submitted by GZA GeoEnvironmental, Inc. on behalf of the HP Inc. for its Voluntary Remediation Project located in San Germán, Puerto Rico.

After a thorough review, the DNER has determined that the report complied with the reporting requirements of the Revised Intrinsic Biodegradation Work Plan (IB Work Plan, 2015). However, there are some comments that HP, Inc. should address. Please refer to the Technical Review enclosed.

In addition, the DNER's Quality Assurance and Quality Control (QA/QC) Office (former EQB's QA/QC Office) has evaluated the quality of the data of the aforementioned progress report. Please find enclosed QA/QC Office's Data Quality Assessment Report for comments and recommendations.

Regarding the proposed change to the sampling program request to divide the sampling frequency into three categories (i.e., semiannual, biennial, and quadrennial), the DNER has determined to **deny** your petition. According to the analytical results and trend analysis, DNER has determined that there still exist uncertainty of the contamination distribution and extent (horizontally). Thus, the DNER requires HP, Inc. to continue monitoring all wells in a semi-annual basis to complete at least four (4) rounds (data points) per each well. Once completed the 8 rounds, the DNER will evaluate the results to determine if supplemental investigation is warranted. If not warranted, the DNER may recommend to proceed with remedy selection process after the due report with supporting documentation be submitted by HP Inc.

DNER allows you forty-five (45) days after receipt of this communication to respond to the enclosed Technical Review and the Data Quality Assessment Report comments and recommendations.

Although the DNER is currently the lead agency for this project, please note that the EPA will also be reviewing the document thus separate comments may be issued from that agency. Should you have any questions, please contact Eng. Josephine C. Acevedo Esquilín, Project Manager of the HWPD via email to josephineacevedo@jca.pr.gov or by phone at (787) 767-8181, extension 3459.

Cordially,

María A. Coronado Baca, P.G.
Acting Manager
Land Pollution Control Area

Enclosures:

- Technical Review of HP, Inc.'s Semi-Annual Project Progress Report, June (Q3) through December 2018 (Q4).
- Data Quality Assessment Report of Semi-Annual Project Progress Report, June (Q3) through December 2018 (Q4), HP, Inc., San Germán, PR.

c: Mr. John A. Colbert, GZA GeoEnvironmental, Inc., via email to: john.colbert@gza.com
Mr. Roger Anderson, TRC, via email to: randerson@trccompanies.com
Ms. Socorro Martínez, EPA, via email to: martinez.socorro@epa.gov

TECHNICAL REVIEW

Document Title:	Semi-Annual Project Progress Report, June (Q3) through December (Q4) 2018
Facility name:	HP, Inc.
Facility address:	Road PR-362, San Germán, PR
EPA Id. No.:	PRD991291857
Reviewed by:	Eng. Josephine C. Acevedo Esquilín, Hazardous Waste Permits Division

The Hazardous Waste Permits Division of the Land Pollution Control Area of the former Puerto Rico Environmental Quality Board (EQB), now merged to the Department of Natural and Environmental Resources (DNER), has performed the review of the Semi-Annual Project Progress Report, July 2018 (Q3) through December 2018 (Q4), dated February 12, 2019 submitted by HP, Inc. for its former facility (a.k.a. Hewlett-Packard Company) located in San Germán, Puerto Rico. This Semi-Annual Project Progress Report is submitted in support of HP, Inc. Voluntary Soil and Groundwater Remediation Project at this former facility.

Site Background[i]:

Digital Equipment Corporation (DEC), former site operator leased the property to the Puerto Rico Industrial Development Company (PRIDCO). DEC operated the facility as a power wire board (PWB) and module assembly manufacturing facility from 1968 until 1992. Then the facility was leased by Circo Caribe until March 2001. In October 2001, an employee group formed the former PCB Horizon Technology, Inc. and continued the operations of the PWB production from November 2002 until 2005. PCB Horizon Technology, Inc. was later bought by Compaq Computer Corporation (Compaq). In May 2005, Compaq merged with Hewlett-Packard Company, now known as HP, Inc. Currently, HP is responsible for the ongoing corrective actions at the facility[ii].

The PWB manufacturing employed the use of acids, alkalines, metal-bearing plating solutions, and oxidizing/reducing chemicals. Between 1976 and 1978, DEC used trichloroethene (TCE) in the wave solder process as a degreaser. TCE was changed in 1978 for an aqueous detergent solution.

After several investigations, DEC determined that releases of TCE and cis-1,3-dichloroethylene to the environment occurred. DEC installed a groundwater extraction and treatment (GWTS, pump and treat) system and a soil vapor extraction (SVE) to remediate the contaminated media. The SVE and GWTS[iii] was later shut down. The efficiency of the GWTS had diminished and HP stopped its use and started evaluation intrinsic biodegradation. Currently, HP is evaluating an intrinsic bioremediation study. An Intrinsic Biodegradation Study (IBS) Work Plan, dated October 2010, submitted by HP Inc. was approved by the former EQB. On April 2015, HP Inc. submitted to the EQB the first revision to the IBS Work Plan to evaluate Enhanced Reductive Dechlorination (ERD) with the injection of an electron donor carbon substrate (Anaerobic Biochem, ABC®), and the injection of specialized bacteria cultures (KB-1 ®) for

[i] Facility background information obtained from the United States Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA) Corrective Action Documentation for Environmental Indicator (EI) Determination CA725, Current Human Exposure under Control, as of September 9, 2015.
[ii] Although the facility is vacant, it is being refurbished by PRIDCO to lease the property again.
[iii] HP Inc. will start the dismantling of the GWTS remains by October 2019 as notified on September 6, 2019 by HP to the DNER and PRIDCO.

bioaugmentation, if necessary. Such IBS Work Plan-Revision 1 was approved by EQB on November 2015[iv].

After thorough review of the report, the HWPD has the following findings and comments:

Findings:

1. The results show that the TCE concentrations are still present in focal points in fill/alluvium and saprolite/bedrock geological units. TCE concentrations (as shown in Figure 4B) are higher in saprolite than bedrock, except for bedrock unit at offsite wells OW-304R, GZ-701R, and GZ-601R.

2. According to the data tables and trend charts, some wells were not sampled for a long period of time. The following monitoring wells were not sampled around years 2002/2003 through 2010, afterwards the sampling began but the sampling frequency have changed (reduced): GZ-501L, GZ-503L, GZ-519U, GZ-511U, WB-3L, OW-401, OW-402R, OW-402L, OW-402U, and OW-305U.

3. TCE, cis-1,2-dichloroethene (cDCE) and vinyl chloride (VC) concentrations were above their corresponding MCL/PRWQS[v]. TCE and cDCE concentrations at monitoring well GZ-501L have increased after the GWCTS was shutdown.

4. TCE and cDCE concentrations at monitoring well GZ-502L dropped after GWCTS shutdown in 2010 but have increased after October 2014 until October 2018 where they were above their corresponding MCL/PRWQS.

5. Monitoring well GZ-503L was not sampled from 2003 until 2010, when the GWCTS was shutdown. However, the TCE and cDCE concentrations showed an increasing trend after 2010 until 2013. Since 2013 the TCE and cDCE concentrations has been unsteady above their corresponding MCL/PRWQS.

6. TCE and cDCE concentrations have increasing trend at monitoring well GZ-504R after the GWCTS shutdown in 2010. In addition, the April 2018 analytical result for TCE reported non-detect, but the October 2018 TCE value exceeded the MCL/PRWQS. cDCE and VC exceeded their corresponding MCL/PRWQS also.

7. Since the GWTS shutdown, TCE and cDCE concentrations at monitoring well GZ-505L have a decreasing trend, while the TCE, cDCE and VC concentrations at monitoring well GZ-505R have increased exceeding the MCL/PRWQS. This means that the contamination is flowing vertically down to bedrock at the southwest of the parking lot.

8. TCE and cDCE concentrations at monitoring well GZ-506R showed unstable and erratic trends. After 2013, the TCE and cDCE were decreasing; however, TCE and cDCE increased and VC has no changed in October 2018. Only TCE and VC exceeded their applicable MCL/PRWQS, respectively.

[iv] Later, in August 8, 2019, GZA on behalf of HP Inc. requested a concurrence letter from the former EQB (now DNER) for the supplemental installation of injection wells to expand the ERD pilot test. In letter dated September 3, 2019, the DNER conditionally concurred with such proposal.

[v] MCL stands for Maximum Concentration Level, and PRWQS stands for Puerto Rico Water Quality Standards. The corresponding MCL and/or PRWQS for TCE is 5.0 micrograms per liter (µg/L), for cDCE is 70 µg/L, and VC is 0.25 µg/L. In the case of cDCE and VC, they are daughter (degradation) compounds of TCE.

9. Monitoring well GZ-511U was not sampled from 2003 until 2010, when the GWCTS was shutdown. After 2010, the sampling was performed biennially. However, the TCE and cDCE concentrations trends are erratic. In the case of VC, the results are very similar from previous years. The October 2018 sampling event results indicated that TCE (93 µg/L) and VC (0.33J µg/L) exceeded their applicable MCL/PRWQS at this well. Due to the high TCE concentrations still present and the unpredictable trend, this well shall be sampled at least semi-annually.

10. TCE, cDCE and VC concentrations at monitoring well GZ-515U were constantly non-detect.

11. Monitoring well GZ-519U was not sampled from 2003 until 2010, when the GWCTS was shutdown. The TCE and cDCE concentrations are very similar in an upward trend. Certainly, TCE and cDCE concentrations have increased since the GWCTS shutdown, and their concentrations are still above the applicable MCL/PRQWS. In the case of VC, although its concentration is steady, it was detected (0.42J µg/L) above its corresponding MCL/PRWQS.

12. TCE and VC concentrations at monitoring well GZ-601R exceeded the applicable MCL/PRWQS. In the case of TCE, it was detected (83 µg/L) more than 10 times the previous result (0.47 µg/L, April 2018) at this well. TCE was below its MCL/PRWQS since June 2015 until April 2018.

13. Monitoring well GZ-702R showed a decreasing trend from June 2015 until April 2018 for TCE, cDCE and VC, but in October 2018 TCE and VC showed a moderate increase above its applicable MCL/PRWQS.

14. Although TCE and cDCE concentrations trends are very similar at monitoring well OW-101, such trends are not clear and erratic. For TCE and cDCE concentrations were above their corresponding MCL/PRWQS more than a hundred-fold. In the case of VC, although its concentration is steady, it was detected (4.1J µg/L) above its corresponding MCL/PRWQS.

15. TCE, cDCE and VC concentrations at monitoring well OW-301 were constantly non-detect.

16. Monitoring well OW-304L represents a hot zone at the saprolite unit where hazardous waste spill had occurred in the chemical storage tank, as identified in the RCRA Facility Assessment[vi] (RFA, 1990) and in the RCRA Facility Investigation Summary Report (RFI, 1995). Although this well shows a decreasing trend, the analytical data results of TCE, cDCE and VC continues exceeding the applicable MCL/PRWQS.

17. Monitoring well OW-304R represents a hot zone at the bedrock unit where hazardous waste spill had occurred in the chemical storage tank, as identified in the RFA and RFI. Although this well shows a decreasing trend, the analytical data results of TCE, cDCE and VC continues exceeding the applicable MCL/PRWQS.

18. Monitoring well OW-305U was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, the well was sampled semi-annually until 2014, when it was sampled biennially. During

[vi] In October 1990, the former Puerto Rico Environmental Quality Board issued a RFA and identified eight RCRA solid waste management units (SWMU) and one area of concern (AOC). Then, in February 1995, the former EQB revised the RFA and indicated that no further action was required at six of the eight SMWUs. EQB recommended action at the two other SMWUs and identified the loading dock as SWMU-9. In July 1995, a RFI Summary Report was prepared by GZA GeoEnvironmental Inc. on behalf of Digital Equipment Company and submitted to the EQB.

that period TCE and cDCE were below the applicable MCL/PRWQS, except VC which exceeded the MCL/PRWQS twice (April 2011 and April 2012). However, TCE and VC had exceeded their corresponding MCL/PRWQS since April 2014, and cDCE since October 2016. Further, this well has exceeded the applicable MCL/PRWQS for TCE, cDCE and VC after the substrate and bioaugmentation injection in October 2016. This well is located in the fill unit layer and represents a hot zone at the southwest of the hazardous waste storage area.

19. Monitoring well OW-305L was sampled semi-annually until 2014, when it was sampled biennially. TCE, cDCE and VC had exceeded their corresponding MCL/PRWQS since 2000. Further, after the substrate and bioaugmentation injection in October 2016, this well have increase TCE, cDCE and VC concentrations. This well is located in the fill unit layer and represents a hot zone at the southwest of the hazardous waste storage area.

20. Monitoring well OW-307 was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, this well has been sampled semi-annually. TCE, cDCE and VC had exceeded their corresponding MCL/PRQWS. TCE and VC concentrations at this monitoring well are unstable.

21. Monitoring well OW-401 was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, this well has been sampled biennially. TCE and VC have exceeded their corresponding MCL/PRQWS four times of the last six samples. In the case of cDCE, it has increased since 2012 but below its applicable MCL/PRWQS. TCE and VC concentrations at this monitoring well are unstable.

22. Monitoring well OW-402U was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, this well has been sampled semi-annually until 2014, when it was sampled biennially. TCE and cDCE has a similar trend. Only TCE continues to exceed the MCL/PRWQS.

23. Monitoring well OW-402L was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, this well has been sampled semi-annually until 2014, when it was sampled biennially. TCE and cDCE has a similar trend. TCE continues to exceed the MCL/PRWQS. VC was detected above its corresponding MCL/PRWQS eight of the last twelve samples.

24. Monitoring well OW-402R was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, this well has been sampled semi-annually until 2014, when it was sampled biennially. TCE continues to exceed the MCL/PRWQS. VC was detected above its MCL/PRWQS.

25. Monitoring well OW-403L was not sampled from 2003 until 2010, when the GWCTS was shutdown. Thereafter, this well has been sampled semi-annually until 2014, when it was sampled biennially. Since 2011, TCE, cDCE and VC has a decreasing trend. Only TCE was detected above its MCL/PRWQS.

26. TCE, cDCE and VC concentrations at monitoring well OW-404L were constantly non-detect or below their corresponding MCL/PRWQS.

27. At monitoring well OW-404R, TCE, cDCE and VC concentrations continues to exceed their corresponding MCL/PRWQS. This well is near the west fence (middle) of the PRIDCO parking lot which separate the PRIDCO property from PREPA property.

28. TCE, cDCE and VC concentrations at monitoring well OW-404U were constantly non-detect.

29. At monitoring well WB-1U, TCE and VC continues to exceed their corresponding MCL/PRWQS. Since October 2016, TCE and cDCE concentrations were decreasing, except for TCE in October 2018. VC concentrations had decreased since previous sampling event in April 2017.

30. At monitoring well WB-1L, TCE and VC continues to exceed their corresponding MCL/PRWQS.

31. At monitoring well WB-2L, only TCE exceeded its corresponding MCL/PRWQS. TCE and cDCE concentrations are unstable.

32. Monitoring well WB-3L was not sampled from 2003 until 2010, when the GWCTS was shutdown. Since then TCE, cDCE and VC concentrations has being increasing exceeding their applicable MCL/PRWQS.

33. At monitoring well WB-4L, TCE and VC continues to exceed their corresponding MCL/PRWQS in an increasing trend.

Comments:

1. HP Inc. concluded that the analytical data of the October 2018 Semi-Annual Project Progress Report suggests that intrinsic biodegradation is occurring at OW-101 and OW-307 only; however, the DNER considers the data suggests that the plume is advancing (displacing) to the west. In addition, data gaps were identified offsite the facility to the southwest of Puerto Rico Electric Power Authority (PREPA) property, and adjoining community and to the northwest of the Puerto Rico Aqueduct and Sewer Authority wastewater treatment plant (PRASA WWTP). Please refer to the September 3, 2019 letter.

2. The distribution and extent (horizontally and vertically) of groundwater contamination with current data must be delineated. In addition, TCE, DCE, and VC isoconcentrations contours must be provided for each geological unit (i.e., fill, alluvium, saprolite and bedrock).

3. A conceptual site model (CSM) must be developed, updated periodically using the current data, and submitted to the DNER.

Additional requirements:

In addition, the following information should also be provided by HP, Inc.:

1. Soil borings logs of all wells, including the abandoned wells. Please include any reference as needed.

2. A figure depicting the contamination distribution in groundwater (contaminants plume). The cross-sections by grids can be depicted.

3. Explain why the following onsite wells were abandoned: W-5, W-6, OW-2, OW-103, OW-106, OW-107, OW-303A, OW-305, OW-302, OW-406, GZ-502U, GZ-516U, DEC-201R, DEC-202O, and DEC- 205O.

PREQB – QUALITY ASSURANCE AND QUALITY CONTROL OFFICE
QA/QC DATA QUALITY ASSESSMENT/VERIFICATION AND DOCUMENT TECHNICAL REVIEW FORM

DOCUMENT:	**SEMI-ANNUAL PROJECT PROGRESS REPORT JULY 2018 (Q3) THROUGH DECEMBER 2018 (Q4).**
SITE NAME:	**HEWLETT-PACKARD VOLUNTARY CLEANUP PROJECT**
EPA ID NO.:	**PRD991291857**
ADDRESS:	**SAN GERMAN, PR**
REVIEWER:	**FRANCES M. SEGARRA ROMÁN, QA/QC MANAGER SPECIALIST**
SIGNATURE:	
DATE:	May 6, 2019

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I. BACKGROUND:

The Hewlett-Packard (HP) occupies a property owned by the Puerto Rico Industrial Development Company (PRIDCO) of approximately 18 acres in size that is located on State Road 362 in the Municipality of San German, Puerto Rico. This site was active since 1968 when a company known as Digital Equipment Corporation (DEC) established its operations on-site. From July 1968 to 1992 DEC leased the property and operated a wire board (PWB) and module assembly manufacturing facility. Circo Caribe leased the property in 1993 and occupied PWB manufacturing facility until March 2001. Then, in October 2001 a group of employees formed PCB Horizon Technology, Inc., continued the PWB production process until November 2005. DEC was later bought by Compaq Computer Corporation (Compaq), which merged with Hewlett Packard (HP) on May 2002. In the past acids, alkaline solutions, metal-bearing plating solutions, and oxidizing/reducing chemicals were used in the PWB manufacture process. Also, between 1976 and 1978, DEC used Trichloroethene (TCE) as a degreaser in the wave soldering process, which was replaced by an aqueous detergent solution in 1978. There are two (2) water tables underneath the site that have been showed by various environmental and hydrogeological investigations to be contaminated by TCE and cis-1, 3-dichloroehtylene (DCE). Even though the site is currently empty and no longer in operations, HP continues carrying out corrective actions as part of a voluntary cleanup process that began in 1994. Many monitoring and extraction wells have been installed on site as part of this cleanup process. In addition, a ground water extraction and treatment (Pump & Treat) system and a soil vapor extraction system (SVE) was installed. However, this system was decommissioned on November 11, 2014 due to the reduction of its efficiency of the system. Currently, HP has an on-going intrinsic bioremediation (IB) study to evaluate whether, in the absence of any additional remedial technologies, IB of the residual chlorinated volatile organic compounds (VOCs) in groundwater can continue to reduce dissolved concentrations, while maintaining a condition of no significant risk to human or environmental receptors.

II. SUMMARY OF THE FIELD SAMPLING ACTIVITIES:

A. GENERAL INFORMATION:

On October 16, 17, 18, and 19, 2018, a semi-annual groundwater sampling event was performed at the HP site as part of the implementation of the October 2014 Intrinsic Biodegradation (IB) Study Work Plan

(Intrinsic Biodegradation Study Work Plan – Revision 1, HP, Voluntary Remedial Actions, San German, Puerto Rico) and as per the approved April 2015 and HP's Revision 4 Quality Assurance Project Plan – Voluntary Remediation Project, San German, Puerto Rico. According to the Report, during these field activities the monitoring wells in the following table were sampled. Based on the Chain of Custody Record Sheets (COCs) and the Analytical Report for this event, the samples collected during the field activities were analyzed by Test American Laboratory for the parameters indicated in the next table:

Field Sample ID	Lab Number	Date Collected	Parameter
GZ-501U	660-90233-10	10/15/2018	Volatile Organic Compounds (VOC) (SW-846 Test Method 8260B)
GZ-501L	660-90233-11	10/15/2018	
OW-407	660-90233-14	10/15/2018	
OW-408	660-90233-15	10/15/2018	
OW-1	660-90233-16	10/15/2018	
DEC-204O	660-90233-18	10/15/2018	
WB-1L	660-90233-3	10/15/2018	
WB-1U	660-90233-4	10/15/2018	
WB-2U	660-90233-5	10/15/2018	
WB-2L	660-90233-6	10/15/2018	
OW-404R	660-90233-7	10/15/2018	
OW-404L	660-90233-8	10/15/2018	
OW-404U	660-90233-9	10/15/2018	
OW-405	660-90259-2	10/16/2018	
OW-305I	660-90259-5	10/16/2018	
GZ-505L	660-90259-6	10/16/2018	
OW-401	660-90259-7	10/16/2018	
BR-308	660-90331-10	10/16/2018	
GZ-505R DUP	660-90331-13	10/16/2018	
GZ-703R (MS/MSD)	660-90331-14	10/16/2018	
GZ-703R DUP	660-90331-15	10/16/2018	
WB-4L DUP	660-90331-7	10/16/2018	
WB-3L DUP	660-90331-8	10/16/2018	
GZ-503U	660-90331-9	10/16/2018	
OW-105	660-90339-10	10/17/2018	
GZ-506U	660-90339-12	10/17/2018	
OW-102	660-90339-13	10/17/2018	
OW-304U	660-90339-15	10/17/2018	
OW-304R	660-90339-17	10/17/2018	
OW-403L	660-90339-18	10/17/2018	
OW-402U	660-90339-3	10/17/2018	
OW-402L (MS/MSD)	660-90339-4	10/17/2018	
OW-402L DUP	660-90339-5	10/17/2018	
OW-402R	660-90339-6	10/17/2018	
OW-402R DUP	660-90339-7	10/17/2018	
OW-101L	660-90339-9	10/17/2018	
GZ-502L	660-90353-10	10/18/2018	
GZ-504U	660-90353-11	10/18/2018	
OW-305U	660-90353-12	10/18/2018	

Field Sample ID	Lab Number	Date Collected	Parameter
Exfluent-101818	660-90353-13	10/18/2018	
GZ-702U	660-90353-3	10/18/2018	
GZ-702R	660-90353-4	10/18/2018	
GZ-601R	660-90353-5	10/18/2018	
GZ-601L	660-90353-6	10/18/2018	
GZ-511U	660-90353-7	10/18/2018	
GZ-701L	660-90353-8	10/18/2018	
GZ-701R	660-90353-9	10/18/2018	
GZ-504R	660-90233-13	10/15/2018	VOC (SW-846 Test Method 8260B) Total Organic Carbon (SM 5310C) Dissolved Gases (MEE) (RSK-175) Dissolved Iron (SW-846 Test Method 6010B)
OW-301	660-90233-17	10/15/2018	
IW-2	660-90259-3	10/16/2018	
IW-3	660-90259-4	10/16/2018	
GZ-505R	660-90331-12	10/16/2018	
IW-1	660-90331-17	10/16/2018	
WB-3L (MS/MSD)	660-90331-3	10/16/2018	
GZ-515U	660-90331-4	10/16/2018	
GZ-503L	660-90331-5	10/16/2018	
WB-4L	660-90331-6	10/16/2018	
GZ-519U	660-90339-11	10/17/2018	
GZ-506R	660-90339-14	10/17/2018	
OW-304L	660-90339-16	10/17/2018	
OW-307	660-90339-19	10/17/2018	
OW-101	660-90339-8	10/17/2018	
GZ-504L	660-90233-12	10/15/2018	

Also, the following QA/QC samples were collected:

Field Sample ID	Lab Number	Time Collected	Date Collected	Parameter
Trip Blank 101518	660-90233-1	0720	10/15/2018	VOC (SW-846 Test Method 8260B)
Field Blank 101518	660-90233-2	0720	10/15/2018	
Trip Blank 1 101618	660-90331-1	0730	10/16/2018	
Trip Blank 2 101618	660-90259-1	0730	10/16/2018	
Trip Blank 101718	660-90339-1	0700	10/17/2018	
Field Blank 101718	660-90339-2	0700	10/17/2018	
Trip Blank 101818	660-90353-1	0700	10/18/2018	
Field Blank 101818	660-90353-2	0700	10/18/2018	

III. ANALYTICAL DATA REVIEW PROCESS:

All the analytical data submitted in the report was reviewed based on the requirements established in PREQB Land Pollution Control Standard Operating Procedure for the Analytical Data Review (PREQB-LPRP-SOP-03, Effective Date: December 8, 2014). In addition, during this review whether or not the samples were collected and analyzed as per the Intrinsic Biodegradation (IB) Study Work Plan and the Hewlett-Packard's Quality Assurance Project Plan (QAPP) was assessed. Since this type of sample event may be

used to assess the horizontal extent of groundwater contamination and determine the need for additional sampling or remedial activities, and because it is part of an ongoing continuous monitoring program, a **general** review was performed. For this purposes, the General Data Review Checklist (PREQB-LPC-SOP-003) was used, which is included as an attachment of this form.

IV. ANALYTICAL DATA QUALITY REVIEW:

A. Findings:

1. No raw data was include to be able to verify the calibration data, which is required for the general data review.

2. The following table contains the groundwater samples in which concentrations of volatile organic compounds (VOCs) were detected above the method detection limit (MDL) and action levels (the Regional Screening Levels for Tap water, PREQB Puerto Rico Water Quality Standards, or Maximum Contamination Levels):

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL_{Tap}	MCL	PRWQS
GZ-504R	660-90233-13	10/15/2018	cis-1,2-Dichloroethylene	**19 µg/L**	3.6	70	-----
			Trichloroethene	**6.4 µg/L**	0.28	5.0	5.0
GZ-501L	660-90233-11	10/15/2018	cis-1,2-Dichloroethylene	**49 µg/L**	3.6	70	-----
			Trichloroethene	**28 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.89 J µg/L**	0.019	2.0	0.25
OW-404R	660-90233-7	10/15/2018	cis-1,2-Dichloroethylene	**73 µg/L**	3.6	70	-----
			Trichloroethene	**37 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.98 J µg/L**	0.019	2.0	0.25
WB-1L	660-90233-3	10/15/2018	cis-1,2-Dichloroethylene	**130 µg/L**	3.6	70	-----
			Trichloroethene	**110 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**1.1 µg/L**	0.019	2.0	0.25
OW-408	660-90233-15	10/15/2018	cis-1,2-Dichloroethylene	**13 µg/L**	3.6	70	-----
			Trichloroethene	**21 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.61 J µg/L**	0.019	2.0	0.25
WB-1U	660-90233-4	10/15/2018	cis-1,2-Dichloroethylene	**29 µg/L**	3.6	70	-----
			Trichloroethene	**27 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.41 J µg/L**	0.019	2.0	0.25
WB-2L	660-90233-6	10/15/2018	cis-1,2-Dichloroethylene	**18 µg/L**	3.6	70	-----
			Trichloroethene	**5.2 µg/L**	0.28	5.0	5.0
WB-4L	660-90331-6	10/16/2018	cis-1,2-Dichloroethylene	**66 µg/L**	3.6	70	-----
			Tetrachloroethene	**4.7 µg/L**	4.1	5.0	5.0
			Vinyl chloride	**2.3 µg/L**	0.019	2.0	0.25
WB-4L DUP	660-90331-7	10/16/2018	cis-1,2-Dichloroethylene	**65 µg/L**	3.6	70	-----
			Tetrachloroethene	**4.7 µg/L**	4.1	5.0	5.0
			Trichloroethene	**130 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**2.4 µg/L**	0.019	2.0	0.25
WB-3L	660-90331-3	10/16/2018	cis-1,2-Dichloroethylene	**100 µg/L**	3.6	70	-----
			Trichloroethene	**71 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**7.3 µg/L**	0.019	2.0	0.25
WB-3L DUP	660-90331-8	10/16/2018	Trichloroethene	**71 µg/L**	0.28	5.0	5.0

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL_{Tap}	MCL	PRWQS
			Vinyl chloride	**7.5 µg/L**	0.019	2.0	0.25
GZ-505R	660-90331-12	10/16/2018	cis-1,2-Dichloroethylene	**89 µg/L**	3.6	70	-----
			Trichloroethene	**90 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**8.3 µg/L**	0.019	2.0	0.25
GZ-505R DUP	660-90331-13	10/16/2018	cis-1,2-Dichloroethylene	**90 µg/L**	3.6	70	-----
			Trichloroethene	**91 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**8.2 µg/L**	0.019	2.0	0.25
GZ-503L	660-90331-5	10/16/2018	cis-1,2-Dichloroethylene	**76 µg/L**	3.6	70	-----
			Trichloroethene	**57 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**8.2 µg/L**	0.019	2.0	0.25
IW-1	660-90331-17	10/16/2018	cis-1,2-Dichloroethylene	**240 µg/L**	3.6	70	-----
			Vinyl chloride	**3.0 µg/L**	0.019	2.0	0.25
IW-2	660-90259-3	10/16/2018	cis-1,2-Dichloroethylene	**6.4 µg/L**	3.6	70	-----
GZ-703R	660-90331-14	10/16/2018	cis-1,2-Dichloroethylene	**22 µg/L**	3.6	70	-----
			Trichloroethene	**64 µg/L**	0.28	5.0	5.0
GZ-703R DUP	660-90331-15	10/16/2018	cis-1,2-Dichloroethylene	**21 µg/L**	3.6	70	-----
			Trichloroethene	**59 µg/L**	0.28	5.0	5.0
BR-308	660-90331-10	10/16/2018	cis-1,2-Dichloroethylene	**46 µg/L**	3.6	70	-----
			Trichloroethene	**13 µg/L**	0.28	5.0	5.0
IW-3	660-90259-4	10/16/2018	cis-1,2-Dichloroethylene	**5.6 µg/L**	3.6	70	-----
OW-401	660-90259-7	10/16/2018	cis-1,2-Dichloroethylene	**60 µg/L**	3.6	70	-----
			Trichloroethene	**13 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**120 µg/L**	0.019	2.0	0.25
OW-305I	660-90259-5	10/16/2018	cis-1,2-Dichloroethylene	**810 µg/L**	3.6	70	-----
			Trichloroethene	**350 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.47 J µg/L**	0.019	2.0	0.25
OW-101L	660-90339-9	10/17/2018	cis-1,2-Dichloroethylene	**51 µg/L**	3.6	70	-----
			Trichloroethene	**2.8 µg/L**	0.28	5.0	5.0
OW-101	660-90339-8	10/17/2018	cis-1,2-Dichloroethylene	**540 µg/L**	3.6	70	-----
			trans-1,2-Dichloroethene	**120 µg/L**	36	100	-----
			Trichloroethene	**680 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**4.1 J µg/L**	0.019	2.0	0.25
OW-402U	660-90339-3	10/17/2018	cis-1,2-Dichloroethylene	**9.9 µg/L**	3.6	70	-----
			Trichloroethene	**30 µg/L**	0.28	5.0	5.0
OW-402L	660-90339-4	10/17/2018	cis-1,2-Dichloroethylene	**43 µg/L**	3.6	70	-----
			Trichloroethene	**23 µg/L**	0.28	5.0	5.0
OW-402L DUP	660-90339-5	10/17/2018	cis-1,2-Dichloroethylene	**44 µg/L**	3.6	70	-----
			Trichloroethene	**23 µg/L**	0.28	5.0	5.0
OW-402R	660-90339-6	10/17/2018	cis-1,2-Dichloroethylene	**27 µg/L**	3.6	70	-----
			Trichloroethene	**13 µg/L**	0.28	5.0	5.0
OW-402R DUP	660-90339-7	10/17/2018	cis-1,2-Dichloroethylene	**28 µg/L**	3.6	70	-----
			Trichloroethene	**13 µg/L**	0.28	5.0	5.0
GZ-519U	660-90339-11	10/17/2018	Chloroform	**0.81 J µg/L**	0.22	80.0	57
			cis-1,2-Dichloroethylene	**90 µg/L**	3.6	70	-----
			Trichloroethene	**180 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.42 J µg/L**	0.019	2.0	0.25
GZ-506U	660-90339-12	10/17/2018	Trichloroethene	**1.4 µg/L**	0.28	5.0	5.0

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL Tap	MCL	PRWQS
GZ-506R	660-90339-14	10/17/2018	cis-1,2-Dichloroethylene	**40 µg/L**	3.6	70	-----
			Trichloroethene	**42 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**1.3 µg/L**	0.019	2.0	0.25
OW-403L	660-90339-18	10/17/2018	cis-1,2-Dichloroethylene	**19 µg/L**	3.6	70	-----
			Trichloroethene	**20 µg/L**	0.28	5.0	5.0
OW-307	660-90339-19	10/17/2018	cis-1,2-Dichloroethylene	**410 µg/L**	3.6	70	-----
			Trichloroethene	**210 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**14 µg/L**	0.019	2.0	0.25
OW-304R	660-90339-17	10/17/2018	1,2-Dichloroethane	**5.6 µg/L**	0.17	5	3.8
			cis-1,2-Dichloroethylene	**160 µg/L**	3.6	70	-----
			Trichloroethene	**690 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**50 µg/L**	0.019	2.0	0.25
OW-304L	660-90339-16	10/17/2018	1,2-Dichloroethane	**0.68 J µg/L**	0.17	5	3.8
			cis-1,2-Dichloroethylene	**150 µg/L**	3.6	70	-----
			Vinyl chloride	**6.6 µg/L**	0.019	2.0	0.25
			Trichloroethene	**360 µg/L**	0.28	5.0	5.0
GZ-601R	660-90353-5	10/18/2018	cis-1,2-Dichloroethylene	**46 µg/L**	3.6	70	-----
			Trichloroethene	**83 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.39 J µg/L**	0.019	2.0	0.25
GZ-701L	660-90353-8	10/18/2018	Chloroform	**0.81 J µg/L**	0.22	80.0	57
GZ-702R	660-90353-4	10/18/2018	cis-1,2-Dichloroethylene	**39 µg/L**	3.6	70	-----
			Trichloroethene	**7.8 µg/L**	0.28	5.0	5.0
GZ-702U	660-90353-3	10/18/2018	Trichloroethene	**1.3 µg/L**	0.28	5.0	5.0
GZ-502L	660-90353-10	10/18/2018	cis-1,2-Dichloroethylene	**48 µg/L**	3.6	70	-----
			Trichloroethene	**32 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**1.1 µg/L**	0.019	2.0	0.25
GZ-511U	660-90353-7	10/18/2018	cis-1,2-Dichloroethylene	**65 µg/L**	3.6	70	-----
			Trichloroethene	**93 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**0.33 J µg/L**	0.019	2.0	0.25
OW-305U	660-90353-12	10/18/2018	cis-1,2-Dichloroethylene	**340 µg/L**	3.6	70	-----
			trans-1,2-Dichloroethene	**9.5 µg/L**	36	100	-----
			Trichloroethene	**140 µg/L**	0.28	5.0	5.0
			Vinyl chloride	**5.3 µg/L**	0.019	2.0	0.25

Abbreviations: J = Qualifier that indicates that the concentration is an estimated value; RSL Tap = USEPA Regional Screening Level Summary Table for Tap Water (TR=1E-6, HQ=0.1) - November 2018; MCL = Maximum Contaminants Level at the USEPA Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=0.1) – November 2018; PRWQS = PREQB. March 2010. Puerto Rico Water Quality Standard (PRWQS) for groundwater.

3. The following table contains the groundwater samples in which concentrations of volatile organic compounds (VOCs) were detected above the method detection limit (MDL), but below the action levels (the Regional Screening Levels for Tap water, PREQB Puerto Rico Water Quality Standards, or Maximum Contamination Levels).

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL Tap	MCL	PRWQS
GZ-501L	660-90233-11	10/15/2018	1,1-Dichloroethane	0.93 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.67 J µg/L	28	-----	7.0

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL_{Tap}	MCL	PRWQS
			Tetrachloroethene	3.0 µg/L	4.1	5.0	5.0
OW-404R	660-90233-7	10/15/2018	1,1-Dichloroethene	0.76 J µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	1.3 J µg/L	36	100	-----
WB-1L	660-90233-3	10/15/2018	1,1-Dichloroethene	1.1 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	3.6 µg/L	36	100	-----
OW-408	660-90233-15	10/15/2018	trans-1,2-Dichloroethene	3.7 µg/L	36	100	-----
OW-404L	660-90233-8	10/15/2018	cis-1,2-Dichloroethylene	0.36 J µg/L	3.6	70	-----
WB-1U	660-90233-4	10/15/2018	trans-1,2-Dichloroethene	0.81 J µg/L	36	100	-----
DEC-204O	660-90233-18	10/15/2018	Tetrachloroethene	1.0 J µg/L	4.1	5.0	5.0
WB-2L	660-90233-6	10/15/2018	trans-1,2-Dichloroethene	0.48 J µg/L	36	100	-----
WB-4L	660-90331-6	10/16/2018	1,1-Dichloroethene	1.5 µg/L	2.8	-----	-----
			trans-1,2-Dichloroethene	1.1 J µg/L	36	100	-----
WB-4L DUP	660-90331-7	10/16/2018	1,1-Dichloroethene	1.5 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	1.1 J µg/L	36	100	-----
WB-3L	660-90331-3	10/16/2018	1,1-Dichloroethene	1.0 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	4.4 µg/L	36	100	-----
			Tetrachloroethene	3.7 µg/L	4.1	5.0	5.0
WB-3L DUP	660-90331-8	10/16/2018	1,1-Dichloroethene	1.0 µg/L	28	-----	7.0
			cis-1,2-Dichloroethylene	100 µg/L	3.6	70	-----
			trans-1,2-Dichloroethene	4.4 µg/L	36	100	-----
			Tetrachloroethene	3.7 µg/L	4.1	5.0	5.0
GZ-503U	660-90331-9	10/16/2018	cis-1,2-Dichloroethylene	5.2 µg/L	3.6	70	-----
GZ-505R	660-90331-12	10/16/2018	1,1-Dichloroethene	0.95 J µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	1.4 J µg/L	36	100	-----
			Tetrachloroethene	1.8 J µg/L	4.1	5.0	5.0
GZ-505R DUP	660-90331-13	10/16/2018	1,1-Dichloroethene	1.0 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	1.5 J µg/L	36	100	-----
			Tetrachloroethene	1.9 J µg/L	4.1	5.0	5.0
GZ-503L	660-90331-5	10/16/2018	trans-1,2-Dichloroethene	4.9 µg/L	36	100	-----
			Tetrachloroethene	2.6 µg/L	4.1	5.0	5.0
IW-1	660-90331-17	10/16/2018	trans-1,2-Dichloroethene	10 µg/L	36	100	-----
GZ-505L	660-90259-6	10/16/2018	cis-1,2-Dichloroethylene	0.76 J µg/L	3.6	70	-----
IW-2	660-90259-3	10/16/2018	Methylene Chloride	2.5 J µg/L	11	2.0	46
GZ-703R	660-90331-14	10/16/2018	1,1-Dichloroethene	0.77 J µg/L	28	-----	7.0
			Tetrachloroethene	0.67 J µg/L	4.1	5.0	5.0
			Vinyl chloride	0.28 J µg/L	0.019	2.0	0.25
GZ-703R DUP	660-90331-15	10/16/2018	1,1-Dichloroethene	0.83 J µg/L	28	-----	7.0
			Tetrachloroethene	0.77 J µg/L	4.1	5.0	5.0
BR-308	660-90331-10	10/16/2018	1,1-Dichloroethane	0.42 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.36 J µg/L	28	-----	7.0
			Vinyl Chloride	0.30 J µg/L	0.019	2.0	0.25
IW-3	660-90259-4	10/16/2018	Chloroform	0.68 J µg/L	0.22	80.0	57
			Methylene Chloride	3.3 J µg/L	11	2.0	46
			Vinyl chloride	0.48 J µg/L	0.019	2.0	0.25
OW-401	660-90259-7	10/16/2018	1,1-Dichloroethane	0.38 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.85 J µg/L	28	-----	7.0
OW-305I	660-90259-5	10/16/2018	trans-1,2-Dichloroethene	25 µg/L	36	100	-----

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL_{Tap}	MCL	PRWQS
OW-101L	660-90339-9	10/17/2018	1,1-Dichloroethane	1.3 µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.67 J µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	1.1 J µg/L	36	100	-----
			Vinyl chloride	0.36 J µg/L	0.019	2.0	0.25
OW-101	660-90339-8	10/17/2018	1,1-Dichloroethene	9.6 µg/L	28	-----	7.0
OW-402U	660-90339-3	10/17/2018	trans-1,2-Dichloroethene	0.59 J µg/L	36	100	-----
OW-402L	660-90339-4	10/17/2018	1,1-Dichloroethane	2.1 µg/L	2.8	-----	-----
			1,1-Dichloroethene	1.1 µg/L	28	-----	7.0
			Chloroform	0.43 J µg/L	0.22	80.0	57
			trans-1,2-Dichloroethene	1.2 J µg/L	36	100	-----
			Tetrachloroethene	2.2 µg/L	4.1	5.0	5.0
			Vinyl chloride	0.78 J µg/L	0.019	2.0	0.25
OW-402L DUP	660-90339-5	10/17/2018	1,1-Dichloroethane	1.9 µg/L	2.8	-----	-----
			1,1-Dichloroethene	1.1 µg/L	28	-----	7.0
			Chloroform	0.42 J µg/L	0.22	80.0	57
			trans-1,2-Dichloroethene	1.2 J µg/L	36	100	-----
			Tetrachloroethene	2.2 µg/L	4.1	5.0	5.0
			Vinyl chloride	0.78 J µg/L	0.019	2.0	0.25
OW-402R	660-90339-6	10/17/2018	1,1-Dichloroethane	0.61 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.27 J µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	0.59 J µg/L	36	100	-----
			Tetrachloroethene	3.1 µg/L	4.1	5.0	5.0
			Vinyl chloride	0.28 J µg/L	0.019	2.0	0.25
OW-402R DUP	660-90339-7	10/17/2018	1,1-Dichloroethane	0.62 J µg/L	2.8	-----	-----
			trans-1,2-Dichloroethene	0.62 J µg/L	36	100	-----
			Tetrachloroethene	2.9 µg/L	4.1	5.0	5.0
GZ-519U	660-90339-11	10/17/2018	1,1-Dichloroethane	0.40 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	2.6 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	4.7 µg/L	36	100	-----
GZ-506U	660-90339-12	10/17/2018	cis-1,2-Dichloroethylene	0.40 J µg/L	3.6	70	-----
GZ-506R	660-90339-14	10/17/2018	1,1-Dichloroethane	1.6 µg/L	2.8	-----	-----
			1,1-Dichloroethene	1.0 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	0.68 J µg/L	36	100	-----
			Tetrachloroethene	0.52 J µg/L	4.1	5.0	5.0
OW-403L	660-90339-18	10/17/2018	Dichlorodifluoromethane	6.4 µg/L	20	-----	
			1,1-Dichloroethane	1.3 µg/L	2.8	-----	-----
			Tetrachloroethene	0.83 J µg/L	4.1	5.0	5.0
OW-307	660-90339-19	10/17/2018	1,1-Dichloroethene	1.5 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	8.4 µg/L	36	100	-----
OW-304U	660-90339-15	10/17/2018	cis-1,2-Dichloroethylene	0.46 J µg/L	3.6	70	-----
OW-304L	660-90339-16	10/17/2018	1,1-Dichloroethane	2.3 µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	0.99 J µg/L	36	100	-----
GZ-601R	660-90353-5	10/18/2018	1,1-Dichloroethane	0.54 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.79 J µg/L	28	-----	7.0
GZ-702R	660-90353-4	10/18/2018	1,1-Dichloroethene	0.65 J µg/L	28	-----	7.0
			Vinyl chloride	0.98 J µg/L	0.019	2.0	0.25
GZ-702U	660-90353-3	10/18/2018	cis-1,2-Dichloroethylene	1.0 µg/L	3.6	70	-----

Field Sample ID	Lab ID Number	Date Collected	Constituents Detected	Concentration	RSL Tap	MCL	PRWQS
GZ-502L	660-90353-10	10/18/2018	1,1-Dichloroethane	0.62 J µg/L	2.8	-----	-----
			1,1-Dichloroethene	0.99 J µg/L	28	-----	7.0
			Tetrachloroethene	3.1 µg/L	4.1	5.0	5.0
GZ-511U	660-90353-7	10/18/2018	1,1-Dichloroethene	0.30 J µg/L	28	-----	7.0
			trans-1,2-Dichloroethene	2.5 µg/L	36	100	-----
OW-305U	660-90353-12	10/18/2018	1,1-Dichloroethene	1.1 J µg/L	28	-----	7.0

Abbreviations: J = Qualifier that indicates that the concentration is an estimated value; RSL Tap = USEPA Regional Screening Level Summary Table for Tap Water (TR=1E-6, HQ=0.1) - November 2018; MCL = Maximum Contaminants Level at the USEPA Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=0.1) – November 2018; PRWQS = PREQB. March 2010. Puerto Rico Water Quality Standard (PRWQS) for groundwater.

4. Even though in the Chain of Custody Forms (COCs) it is indicated the Field Blank 101618 was collected on October 16, 2018, no certificate of analysis was provided for this sample. Instead a second Trip Blank (TB) was collected and analyzed on the same day. This deviation needs to be clarified, because the field blanks were not collected daily in the frequency required.

5. According to the Data Validation, the recovery percent (% R) of most of the constituents (spiked compounds) in the MS/MSD collected were within the QAPP's acceptance criteria, except for the compounds in the following table:

Spike Substance	MS/MSD Sample ID	% R MS	% R MSD	Acceptance Criteria
Trans-1,2-Dichloroethene	660-90353-6	137 %	-----	64 – 127 %
1,1-Dichloroethene		138 %	-----	60 – 127 %
Tetrachloroethene		131 %	-----	62 – 128 %
Dissolved Iron	660-90259-3	670 %	788 %	75 – 125 %

B. Recommendations:

1. To be able to verify the laboratory test method calibration data, which is needed for the General DQAV, a raw data must be provided by HP.

2. Since the Chain of Custody Record Sheets (COCs) showed that Field Blank 101618 was collected on October 16, 2018, but no Certificate of Analysis (COA) was provided for this sample, this needs to be clarified in written. On that day also, two trip blanks were collected.

3. The inconsistency in the collection of the QA/QC samples (Field Blank (FB) and Trip Blank (TB)) needs to be clarified.

C. Conclusions:

1. All of the analytical test results submitted by Test America Laboratories, Inc. (TALI) **were** certified by a PR-licensed chemist as required.

2. The report contain copies of the COCs. These were signed and filled completely, and all of the samples identified in them match the ones identified in the Test America Laboratory Test Results. However, there was a discrepancy between the information in them and the COA

provided for the samples collected on October 16, 2018, which indicated that one field blank was collected, but no COA was provided for this sample to prove that it was analyzed.

3. Based on the date of collection shown in all of the COCs and the date of analysis showed in the Laboratory Test Reports, all of the samples collected and analyzed did not exceed the test method specific holding time. In addition, all of the samples were received at the temperature required.

4. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) sets were collected in the frequency required by the QAPP.

5. Although in three (3) of the four (4) days of sampling a TB was collected per day, as required, on October 16, 2018, two (2) TB were collected, this needs to be clarified.

6. No contaminants were detected in the following groundwater samples:

Field Sample ID	Lab ID Number	Date Collected
GZ-504L	660-90233-12	10/15/2018
GZ-501U	660-90233-10	10/15/2018
OW-404U	660-90233-9	10/15/2018
OW-407	660-90233-14	10/15/2018
OW-1	660-90233-16	10/15/2018
OW-301	660-90233-17	10/15/2018
WB-2U	660-90233-5	10/15/2018
GZ-515U	660-90331-4	10/16/2018
OW-405	660-90259-2	10/16/2018
OW-105	660-90339-10	10/17/2018
OW-102	660-90339-13	10/17/2018
GZ-601L	660-90353-6	10/18/2018
GZ-701R	660-90353-9	10/18/2018
GZ-504U	660-90353-11	10/18/2018
Exfluent-101818	660-90353-13	10/18/2018

7. No contaminants were detected in all of the QA/QC blanks (Trip Blanks and Field Blanks) collected.

8. The calibration data could not be verified because no raw data was included in the report.

9. VOCs were detected in the following samples both above the method detection limit (MDL) and action levels (the Regional Screening Levels for Tap water, PREQB Puerto Rico Water Quality Standards, or Maximum Contamination Levels) (Finding 2):

Field Sample ID	Lab ID Number	Date Collected
GZ-504R	660-90233-13	10/15/2018
GZ-501L	660-90233-11	10/15/2018
OW-404R	660-90233-7	10/15/2018

Field Sample ID	Lab ID Number	Date Collected
WB-1L	660-90233-3	10/15/2018
OW-408	660-90233-15	10/15/2018
WB-1U	660-90233-4	10/15/2018
WB-2L	660-90233-6	10/15/2018
WB-4L	660-90331-6	10/16/2018
WB-4L DUP	660-90331-7	10/16/2018
WB-3L	660-90331-3	10/16/2018
WB-3L DUP	660-90331-8	10/16/2018
GZ-505R	660-90331-12	10/16/2018
GZ-505R DUP	660-90331-13	10/16/2018
GZ-503L	660-90331-5	10/16/2018
IW-1	660-90331-17	10/16/2018
IW-2	660-90259-3	10/16/2018
GZ-703R	660-90331-14	10/16/2018
GZ-703R DUP	660-90331-15	10/16/2018
BR-308	660-90331-10	10/16/2018
IW-3	660-90259-4	10/16/2018
OW-401	660-90259-7	10/16/2018
OW-305I	660-90259-5	10/16/2018
OW-101L	660-90339-9	10/17/2018
OW-101	660-90339-8	10/17/2018
OW-402U	660-90339-3	10/17/2018
OW-402L	660-90339-4	10/17/2018
OW-402L DUP	660-90339-5	10/17/2018
OW-402R	660-90339-6	10/17/2018
OW-402R DUP	660-90339-7	10/17/2018
GZ-519U	660-90339-11	10/17/2018
GZ-506U	660-90339-12	10/17/2018
GZ-506R	660-90339-14	10/17/2018
OW-403L	660-90339-18	10/17/2018
OW-307	660-90339-19	10/17/2018
OW-304R	660-90339-17	10/17/2018
OW-304L	660-90339-16	10/17/2018
GZ-601R	660-90353-5	10/18/2018
GZ-701L	660-90353-8	10/18/2018
GZ-702R	660-90353-4	10/18/2018
GZ-702U	660-90353-3	10/18/2018
GZ-502L	660-90353-10	10/18/2018
GZ-511U	660-90353-7	10/18/2018
OW-305U	660-90353-12	10/18/2018

10. Based on our evaluation we concluded that, the certified analytical data submitted with the report met most of the general QA/QC requirements established for the SW-846 test methods used and in the PREQB Land Pollution Control Standard Operating Procedure for the Analytical Data Review Analytical Data Review (PREQB-LPRP-SOP-03, Effective Date: December 8, 2014), and can be used for the purpose for which it was generated.

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NOTE: *PREQB **reserves** the right to comment or require additional information regarding this or any subsequent document at a later time.*

GENERAL DATA REVIEW CHECKLIST

EQB	COMMONWEALTH OF PUERTO RICO OFFICE OF THE GOVERNOR ENVIRONMENTAL QUALITY BOARD LAND POLLUTION CONTROL AREA	Checklist Num.:	PREQB-LPC-CL-010		
		Revision Num.:	5		
		Revision Date:	September 30, 2016		
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General Data Quality Review Checklist

Project: Semi-Annual Project Progress Report July 2018 (Q3) through December 2018 (Q4). Hewlett-Packard Voluntary Cleanup Project, San German, PR. USEPA ID. No. PRD991291857

Start Date: April 9, 2019

Final Date: April 11, 2019

Sampling Plan: October 2014 Intrinsic Biodegradation (IB) Study Work Plan (Intrinsic Biodegradation Study Work Plan (Revision 1) & Quality Assurance Project Plan (Revision 4) HP-VCP

Approval Date: April 2015

Reviewer: **Frances M. Segarra Román, QA/QC Specialist Manager**

	YES	NO	NA	UNKNOWN
1. Is the data report certified by a licensed chemist, with the authorization to practice the profession in Puerto Rico?	☑	☐	☐	☐
2. Were the analytical results reviewed as specified in the approved Plan (e.g. SAP[1], QAPP[2])?	☑	☐	☐	☐
3. Were all the requested analysis completed? *	☑	☐	☐	☐
a. Were the samples analyzed by a method cited in the approved Plan (e.g. SAP, QAPP)?	☑	☐	☐	☐
4. Did the Detection Limits/Quantitation limits meet project requirements?	☑	☐	☐	☐
5. Are the analytical results of the samples within the limits or action levels established for each parameter per the approved Plan?	☑	☐	☐	☐
6. Were the units of measurement for a given chemical parameter used consistently throughout the report?	☑	☐	☐	☐
7. Do the analytical results include the date that the chemical analysis was performed?	☑	☐	☐	☐
8. Did the samples meet the holding time per each parameter?	☑	☐	☐	☐
a. If not, indicate the sample (s) number and parameter(s) that was/were exceeded:				
9. Does the data report include the chain of custody form?	☑	☐	☐	☐
If yes,				
a. Was the chain of custody signed and completed properly?	☑	☐	☐	☐
b. Do the samples identified in the data report match with the samples identified in the Chain of custody?*	☑	☐	☐	☐

Comments: * Even though in the Chain of Custody Forms (COCs) it is indicated the Field Blank 101618 was collected on October 16, 2018, no certificate of analysis was provided for this sample. Instead a second Trip Blank (TB) was collected and analyzed on the same day.

10. Does the data report include the following QC sample types:	YES	NO	NA	UNKNOWN
a. Field blank?	☑	☐	☐	☐
b. Trip blank?	☑	☐	☐	☐
c. Equipment blank?	☐	☐	☐	☐
d. Method blank	☑	☐	☐	☐
e. Field duplicate sample?	☑	☐	☐	☐
f. Matrix spike/matrix spike duplicate or MS/MSD?	☑	☐	☐	☐
g. Sample replicate?	☐	☑	☐	☐

EQB	COMMONWEALTH OF PUERTO RICO OFFICE OF THE GOVERNOR ENVIRONMENTAL QUALITY BOARD LAND POLLUTION CONTROL AREA	Checklist Num.:	PREQB-LPC-CL-010
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	YES	NO	NA	UNKNOWN
h. Laboratory control sample?	☑	☐	☐	☐
i. Performance evaluation sample?	☐	☑	☐	☐
j. other:	☐	☐	☐	☐

Comments:

11. Do any of the blanks or samples included in No. 10 detected contamination? If yes, Indicate the blank(s) or **sample(s)** that has contamination:	☐	☑	☐	☐
12. Does the data report include the calculation of the matrix spike?	☑	☐	☐	☐
13. Does the data report include the Recovery percent (% R)?	☑	☐	☐	☐
If yes,				
a. The data report includes the % R limits?	☑	☐	☐	☐
b. Is the % R within the acceptable range? **	☑	☐	☐	☐
14. Does the data report include the calculation of the Relative Percent Difference (RPD) of MS/MSD? If yes,	☑	☐	☐	☐
a. The data report includes the RPD limit?	☑	☐	☐	☐
b. Is the RPD within the acceptable range?	☑	☐	☐	☐
15. For organic compounds, is the calibration curve based on a linear calibration using response factors or calibration factors? If yes,	☑	☐	☐	☐
c. Does the data meet the RSD limits? If not,	☑	☐	☐	☐
d. Indicate the calibration option used (e.g. Correlation coefficient, polynomial regression, etc.):				
16. For inorganic compounds: Is the calibration curve based on a linear calibration using correlation coefficient?	☐	☐	☑	☐
17. Does the data meet the correlation coefficient of at least 0.995?	☑	☐	☐	☐
18. Does the Laboratory explain in the case narrative (if provided) any deviation of the results or an explanation of the data results (e.g. blanks)?	☑	☐	☐	☐

Comments: ** The Matrix Spike S % R for trans-1,2-dichloroethene; 1,1-Dichloroethene; and Tetrachloroethene was outside the acceptance criteria for samples 660-90353-6. The % R for dissolved iron for both the MS and MSD , sample 660-90259, were outside the acceptance criteria.